

## PROJECT DESCRIPTION

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GIS mapping refuge pasture boundaries and applying historic domestic livestock use to accurately assess the overall grazing/browsing use of Refuge habitats.

Fence mapping and livestock pasture boundaries had been accurately completed in GIS for roughly 2/3 of the refuge. This project was needed to complete accurate mapping of the remainder of the refuge, all of which was in Garfield County.

Detailed grazing data (dating back to 1980) has already been compiled in electronic format. Once the pasture GIS layers have been completed, we will link that grazing history over time in GIS to each grazing unit. Having a complete understanding of past livestock grazing intensities will be the foundation for understanding habitat changes resulting from past management actions.

## OBJECTIVES AND ALTERNATIVES

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1. Complete mapping (GIS) of all existing fences to delineate pasture boundaries on the refuge.
2. Complete historic livestock grazing records/occurrence in an electronic database/GIS for the entire refuge.
3. Using the updated map layers to complete grazing history, determine annual grazing pressure/intensity to each pasture/habitat unit. Assess the effects on sentinel plants and habitat quality.
4. Synthesis of existing legacy data (i.e. grouse surveys, mule deer and elk surveys, HDP, fire) in electronic formats with finalized habitat unit layers.

## METHODS AND PROTOCOLS

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Collection of the fence & fence structure data was completed by the station's biological technicians using ArcPad software on Trimble GPS units. Fences were mapped by hiking along fences and each structure encountered was inventoried & mapped as well.

A basic "form" format was designed for use in ArcPad to allow for ease of attribute collection in the field. In addition to spatial data collected, the following information was also collected for each fence; Fence type & construction, post type, number of barbed/smooth wires, condition, and length. Structure data included; structure type, number of posts, post material, condition, and specifics to the structure type (gate size, drainage type, etc.)

## DATA MANAGEMENT

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During field collection, data was checked into an ArcGIS database daily on a designated laptop computer. Data was also backed up locally daily and off-site biweekly. Each day the mapping occurred, the fence database would be "checked out" to the field GPS units to be modified with new fence data. At the end of the day the mapped fences were "checked in" the database. A paper data sheet was completed daily with other information to track the project's progress.

Once edited and merged with existing fence data, all collected and cataloged data will be centralized in Lewistown HQ in the master GIS database. CMR does not have a centralized server so data will be distributed through email or electronic media.

## PARTNERS

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All of the station staff, as well as other refuge personnel have been involved in the project to this point. Contributions were made by designing the database/collection methods, on the ground mapping, technical support, and providing logistical support.

## SOURCES OF SUPPORT

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Technical support was provided by both CMR and Regional GIS staff for assistance with hardware/software issues and lending of equipment. CMR-Jordan staff was able to provide assistance in locating and accessing fences. Jordan management and fire staff assisted throughout the field season with mapping and logistical needs.

## CURRENT STATUS

All on the ground GIS fence data has been collected from the field and is in the process of being refined for the next phase of the project. In 2012 a total of 171 miles of fence were mapped with sub-meter GPS units using ArcPad software. Due to the rough terrain of CMR all fences had to be mapped on foot. The new mapping significantly updated the refuge's data on the actual location of fence lines in Garfield County than previously was available.

The next phase will include taking the newly acquired fence data and creating spatial data layers that can be used to assess historic grazing intensity and patterns across the refuge landscape.

### 2012 Highlights

- 171 miles of fence and 6,619 fence structures were mapped & inventoried.

- 37 days (8-12hrs/day) spent in the field mapping with 1-2 personnel a day, but sometimes required additional staff for logistical/transport needs.

## CHALLENGES

The logistical challenges of this project were numerous as the scope of project was large and required the bulk of the field season for the station's biological technicians (1 Term & 1 STEP Seasonal). Fences are located in areas with limited or no vehicle access with difficult or steep terrain. Some fences required boat access. Permission was also needed from private landowners to access portions of the refuge that are inaccessible to the general public or special use by refuge employees.

